BIOLOGICAL RESOURCES OF THE SAN FRANCISCO BAY/ SACRAMENTO-SAN JOAQUIN DELTA ESTUARY

AQUATIC RESOURCES

PERSPECTIVES OF STATE AND FEDERAL AGENCIES

STATE OF CALIFORNIA - Environmental Protection Agency
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Mr. Steve Yaeger
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Dear Sir,

Thank-you for allowing me to review the two draft briefing papers on Delta biological resources. All my comments pertain to the paper written by Mr. Peter Chadwick entitled "Factors controlling the abundance of aquatic resources in the Sacramento-San Joaquin Estuary".

I have four comments. First, the factors which control the abundance of aquatic resources in the Estuary are controversial and not well understood. They are a topic about which knowledgeable biologists can and do disagree. It is surprising, therefore, to encounter in the text in place of literature citations, statements like "...most biologists believe..." or "...while no consensus exists as to the model's validity, most, if not all, biologists agree that...". The paper would be much stronger if all statements were backed by literature references.

Second, Mr Chadwick is right that hundreds of millions of dollars have been spent on upgrading Valley sewage treatment plants. However, this does not necessarily mean that water quality for aquatic organisms in the Basin has substantially improved as a result of the expenditures. Only 10 to 15 percent of Valley surface water is derived from municipal/industrial discharge. The remaining 85-90 percent comes from non-point sources--agriculture, mining, and urban runoff. Non-point source regulation has proved difficult and it is the consensus of Regional Board staff that the non-point source programs have not been as successful as the point source ones.

Third, I agree with Mr. Chadwick that the diversion and export of water has been detrimental to the aquatic resources in the Estuary. However, I do not believe there is a clear understanding of how much of the decrease in the population level of any species is attributable to flow and how much can be explained by other factors. Certainly, the biological impact of most of these other factors have not been as well researched as flow has. Absence of information does not necessarily mean that impacts are not occurring. I believe that toxics may be important in controlling the abundance and distribution of some river and estuarine species. For example, in a recently completed two and a half year study, 45 miles of San Joaquin River immediately upstream of the Delta tested toxic about half the time in bioassays with the invertebrate Ceriodaphnia dubia (Foe and Connor, 1991). The cause of toxicity appeared to be insecticides entering the river in tail and stormwater runoff from row and orchard crops. The Ceriodaphnia bioassay test is one of the EPA three species freshwater tests (EPA, 1989). Measurement of toxicity in these bioassays is important as EPA (1991) has demonstrated in other aquatic systems that

such toxicity is strongly correlated with instream impacts. In a second study, all small watersheds monitored with orchards (thought to be representative of most small creeks and sloughs in the Sacramento and San Joaquin Valleys) tested acutely toxic to Ceriodaphnia during the February 1992 rain (Foe and Sheipline, 1993). The cause of toxicity was off-target movement of orchard dormant sprays (mostly diazinon). The San Joaquin River was found in the same study to transport acutely toxic dormant spray contaminated water to the southern Delta for eight days. The River's greatest annual flow was during this time period. Finally, the U.S. Geological Survey and the Regional Board observed in a joint study that the San Joaquin River transported high concentrations of diazinon and acutely toxic water to the southern Delta for 12 days in 1993 (Kuivila et al., in prep). During the same storms, pulses of diazinon in the Sacramento River were traced at biologically significant levels as far west as Martinez in the Estuary (Kuivila et al, in prep). It is difficult to believe that events like those described above are not having a measurable impact on some aquatic organisms in the Estuary. These observations are especially troubling as many of the most sensitive freshwater species in the estuary to pesticides (rotifers, cladocerans and copepods) are in decline (Obrebski, et al., 1992).

Finally, Mr. Chadwick states that there is no demonstrated relationship between the decline of any species and the concentration of toxic chemicals in the watershed. We and others have demonstrated that there is a strong statistical relationship between decreases in the striped bass index and concentrations of rice pesticides in the Sacramento River in May and June (Foe and Connor, 1991; Bailey, 1992). The relationship is much stronger than the flow regression developed by the Department of Fish and Game. The striped bass index is important as it is a good predictor of adult bass abundance 2 to 3 years later.

Please call me at 255-3113 if you have any questions.

Christopher Foe

Christopher Foe

enclosure: literature citations

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Literature Citations

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EPA, 1991. Technical Support Document for water quality based toxics control. Office of Water (En-336). EPA/505/2-90-001.

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Foe, C. and R. Sheipline. 1993. Pesticides in surface water from applications on orchards and alfalfa during the winter and spring of 1991-92. Staff report. Central Valley Regional Water Quality Control Board, Sacramento, Ca.

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Kuivila, K.M. and D.D. Copeland. (in prep). Riverine concentrations and transport of a dormant spray pesticide to the San Francisco Bay, California, February 1993.

Obrebski, S., J.J. Orsi, and W. Kimmerer. 1992. Long-term trends in zooplankton distributions and abundance in the Sacramento-San Joaquin Estuary. Technical Report 32. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary.